Serial blood and cerebrospinal fluid ammonia concentrations in dogs with congenital extrahepatic portosystemic shunts before and after surgical attenuation

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Objective: To describe the change in ammonia concentrations in blood (arterial, venous) and cerebrospinal fluid (CSF) in dogs with extrahepatic portosystemic shunts (EHPSS) that underwent surgical attenuation.
Study design: Prospective clinical trial.
Animals: 19 dogs with congenital EHPSS
Methods: Ammonia concentrations were assessed on the day of diagnosis (T0; arterial, venous and CSF), the day of surgery (T1; arterial and venous), and 1 (T2; venous), 3 (T3; arterial, venous and CSF) and 6 (T4; venous) months after surgery.
Results: At the end of the study, the closed group contained 12 dogs and the acquired group 7 dogs. At T0, ammonia concentrations were above the upper reference limit in all dogs. Despite medical management, ammonia concentrations at T1 were not lower than at T0. At T2, ammonia concentrations were below the upper reference limit in all dogs and at T3, ammonia concentrations were below the upper reference limit in 11/12 in the closed and in 3/7 in the acquired group. Arterial and CSF ammonia concentrations demonstrated a strong positive correlation to the venous concentrations (95% and 89%, respectively). The CSF ammonia concentrations were higher than the venous upper reference limit in 17/19 dogs at T0 and the concentrations decreased from T0 to T3 in the closed group.
Conclusion: Postoperative venous ammonia concentration is not an accurate indicator of the degree of shunting. CSF ammonia concentration in dogs with EHPSS had a strong positive correlation with blood ammonia concentration, suggesting permeability of the blood-brain barrier to ammonia.